ROADS
VICTORIA

WINTER, 1989

Victoria's road authorities to amalgamate: page 27

Bridging Jackson's Creek:

Successful Launch, Perfect Touchdown

* Positive Driving * New Options For Old Timber Bridges * Punt Road

ROADS
VICTORIA

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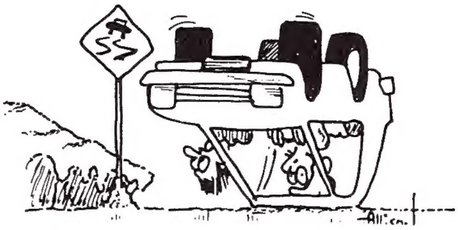

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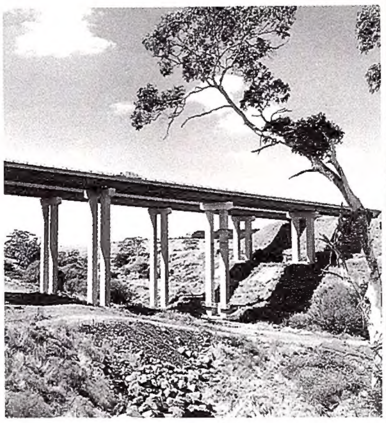

Cover: Traffic began flowing over the twin, six-span Jackson's Creek bridges in March when the $26 million Calder Bypass project was opened. A special feature story, "Bridging Jackson's Creek: Successful Launch, Perfect Touchdown", appears on page 4 of this issue. Details about the official opening of the project appears on page 17.

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Black Brute at Punt Road

The first stage of major drainage works on the Punt Road Widening Project was a black brute in more ways than one.

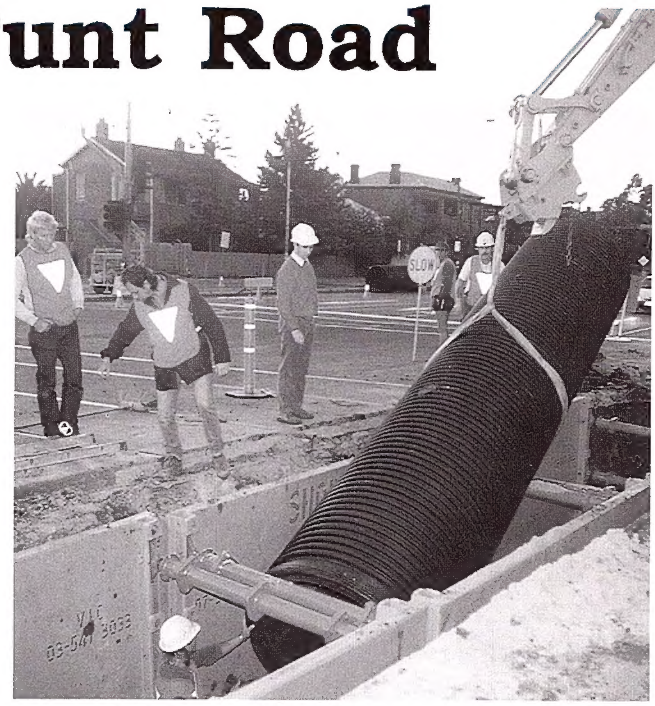
While most of Melbourne enjoyed a well-earned rest after the New Year, there was much bustle by the RCA and Board of Works at the Swan Street intersection. A hundred thousand or more vehicles use this section of Punt Road in Richmond each day, so digging big holes in the road offered enormous potential for traffic chaos.

But, by working 24 hours a day, using the school holiday period, and choosing early January so as to avoid conflicts with events at the nearby sports and entertainment venues, inconvenience to the public was minimised.

Another reason why the job worked so well was the use by the RCA of drainage pipes known as "Black Brutes".

Made from high density polyethylene by Hardie Iplex, they are lighter and much quicker and easier to lay than conventional reinforced concrete pipes.

They can be lifted and placed using an excavator with a canvas sling and can be easily manoeuvred to avoid obstructions in the trench - despite being laid in lengths up to six metres.



A "Black Brute" pipe is placed into position.

A first

This was the first use by RCA of flexible drainage pipes of this nature and size under a road pavement.

The Black Brutes obtain their load-bearing ability by transferring vertical load horizontally to the surrounding soil through deformation of the pipe. As a result, compaction of the backfill materials is critical.

The Board of Works had to reconstruct 45 metres of twin-barrel brick-lined drain, running diagonally across the intersection, with twin 1500mm drains. This work had difficult connections, transitions and bends which were needed to connect the reconstructed drain to the existing upstream portion.

The RCA constructed about 25 metres of 1200mm drain, with trench depths up to 2.8 metres, across the western side of the intersection.

It was necessary to remove the Swan Street tram tracks and they started coming up after the last tram at 7.00pm on Friday, January 6. Both trenches were put down, pipes fitted and filled, and tracks replaced for the first tram at 6.00am Monday morning.

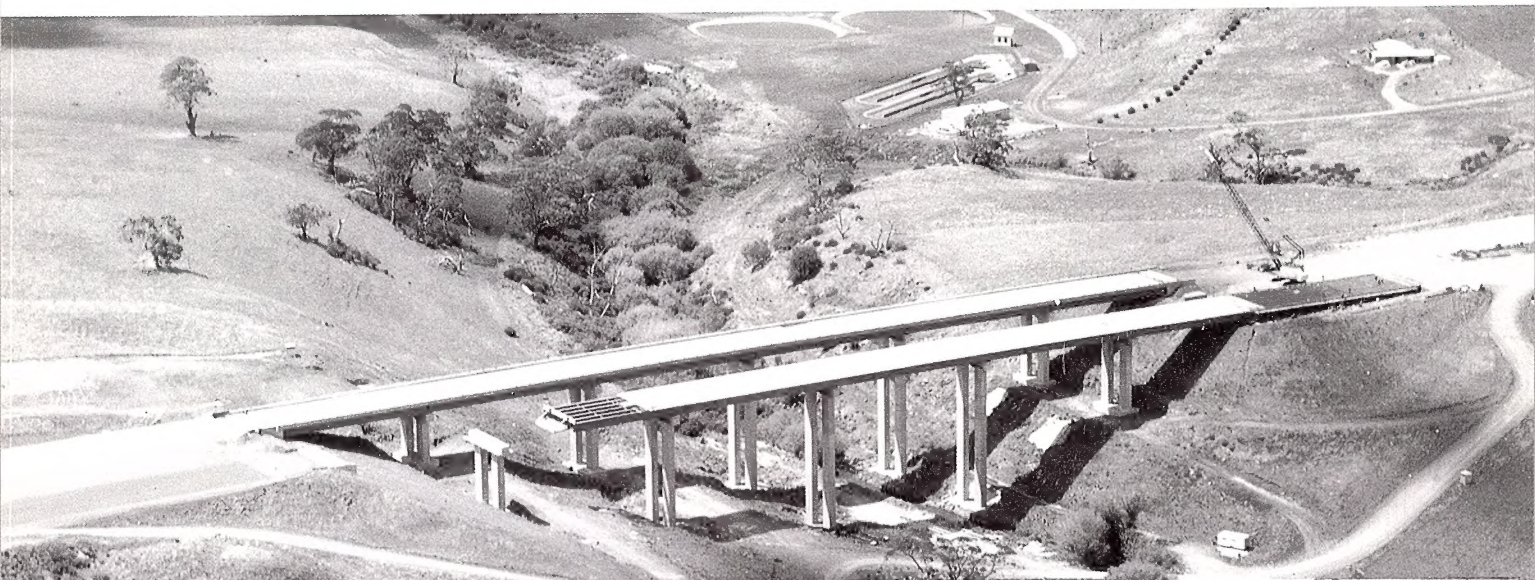
Apart from its construction works, the RCA handled all the traffic management. The Punt Road-Swan Street crossing is a strategic intersection, with no convenient alternative routes. Signs and widespread publicity were used by the RCA to warn the public. Traffic was constantly monitored, traffic light phasing was varied to the changing demands, and where necessary traffic was directed onto other lanes and carriageways.

By 12.30pm on Tuesday afternoon, a week after it all began, works were clear of the road pavement - and clear of the hordes of cricket fans on their way to the MCG to see Australia combat Pakistan. ❑

Profile: Punt Road - See page 11

Midnight roadworks
at Punt Road.

Bridging Jacksons Creek:



Successful Launch, Perfect Touchdown

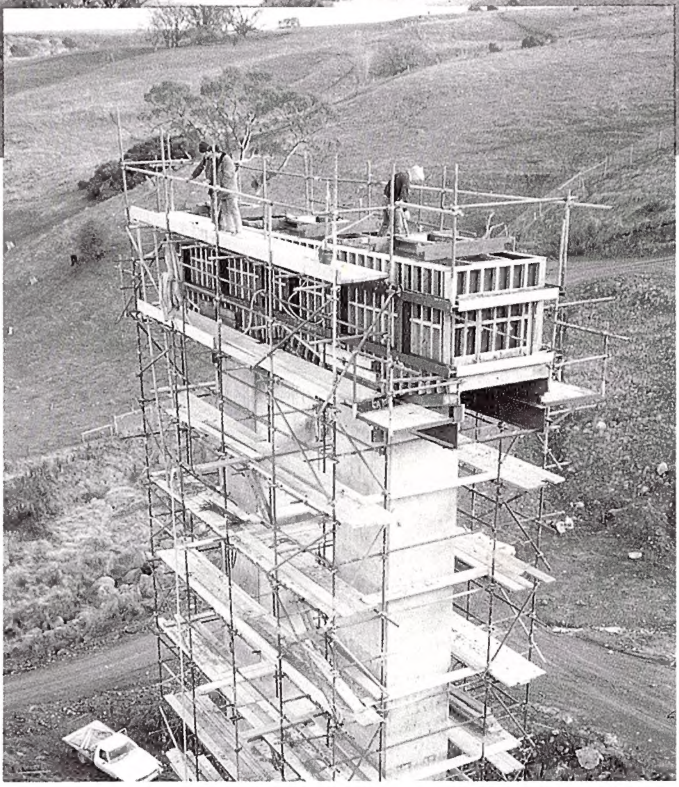
The RCA's $25 million Gisborne Bypass project, part of the $140 million Calder Highway upgrade between Keilor and Bendigo, was completed in good time to handle the high Easter traffic volumes.

Apart from the seasonal timeliness of the opening, the bypass provides a safer, faster route for the 10,000 vehicles estimated to pass through Gisborne daily, the majority of which are bound for Bendigo and Victoria's north-west.

But there's more to the 6km Gisborne bypass than meets the eye, especially when it comes to Jackson's Creek. It's here that an engineering first for Victoria has taken place.

The "Launch"

The twin, six-span bridges are the State's first to be constructed using the incremental launch technique. Put simply, the method involves assembling a bridge superstructure in segments of approximately one span and 'launching' it into its final position.



Concreting the cross-head on Pier number 3 of the west bridge, and ***top photograph****, the job nearly done.*

In this case, the launch took place at the bridge approach on the Melbourne side of the Jackson's Creek valley.

Each segment comprises 1.7 metre-deep steel plate girders with reinforced concrete decking, the only exception being the leading edge of the first segment which, to reduce weight, remained un-decked until finally positioned.

The mechanics of the incremental launch technique involve placing launching jacks under each girder. These, together with other hydraulic jacks, provide the lift and push for each new segment. The trailing edge of each segment is supported by trolleys mounted on rails.

Once assembled, a segment is pushed out until the leading edge is well past one of the pre-constructed piers. At this point the launch stops, another segment is assembled, decking is cast and the process repeated until the bridge is completed.

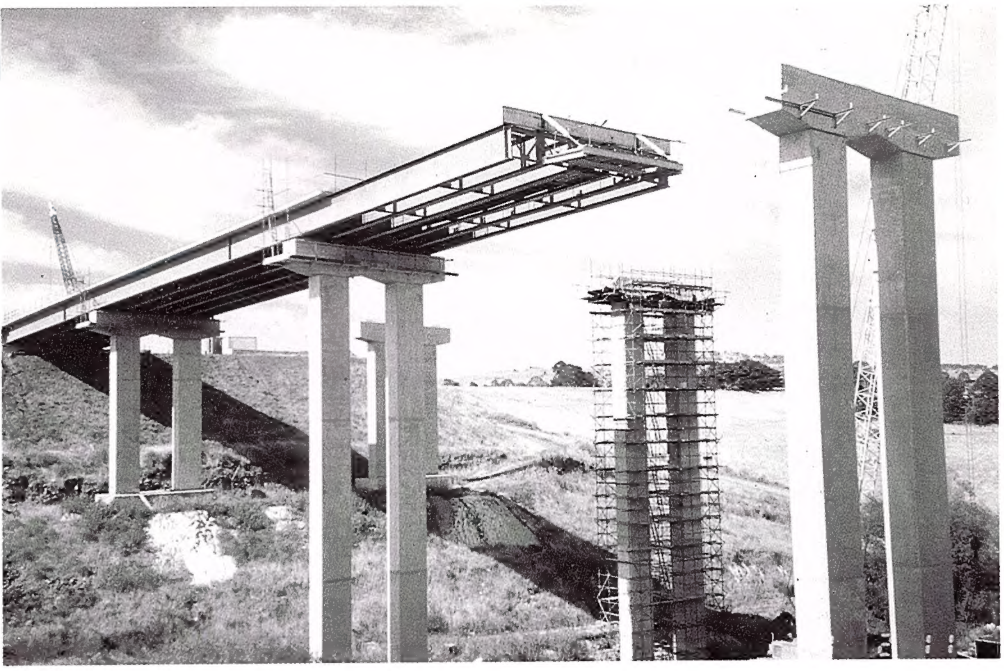
To complete each of the Jackson's Creek bridges, five girder/deck segments had to be assembled and launched. Each 11 metre-wide bridge measures some 217m, comprising four spans of 38m and two of 32m. Support is by five sets of concrete piers with a maximum height of about 31m.

"Challenge"

However, as with all new construction techniques, the incremental launch method has its own special challenges.

One of them is friction. At Jackson's Creek the maximum weight to be launched was some 1700 tonnes, and to move a weight of this magnitude horizontally across 31m high piers requires an absolute minimum of friction.

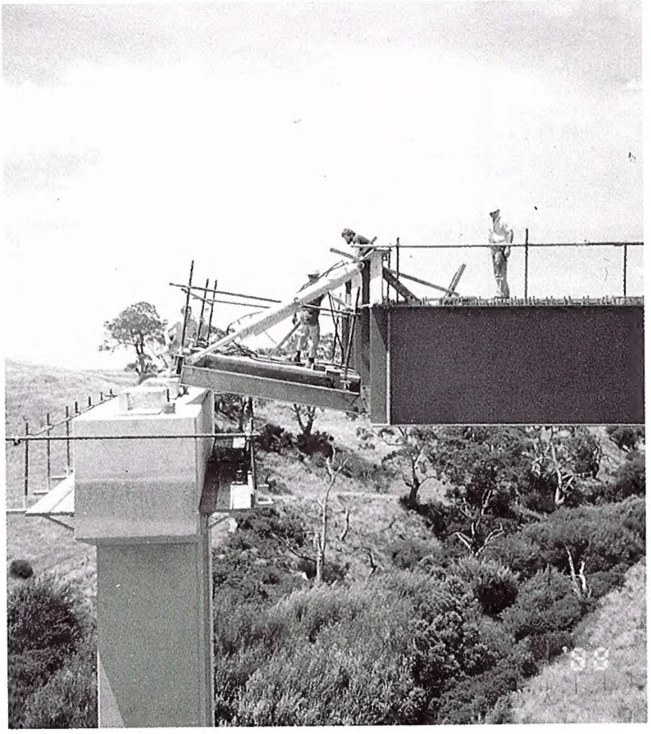
To achieve this, a combination of sliding stainless steel interfaces and temporary bearings utilising a teflon coating were placed under each girder at each pier during launching, and in the 'parked' position. The net result was a friction coefficient of a mere two percent.



East bridge deck.

General Details:

Overall length/each bridge	217 m
Width	11 m
Maximum pier height	31 m
Concrete quantities per bridge:	
Foundations	830 cu. m
Substructure	785 cu. m
Superstructure	435 cu. m
Weight of superstructure	8.5 tonnes/m
Max.horizontal jacking force (16 tonnes/ jack)	100 tonnes total
Max. operating jack pressure	10000psi



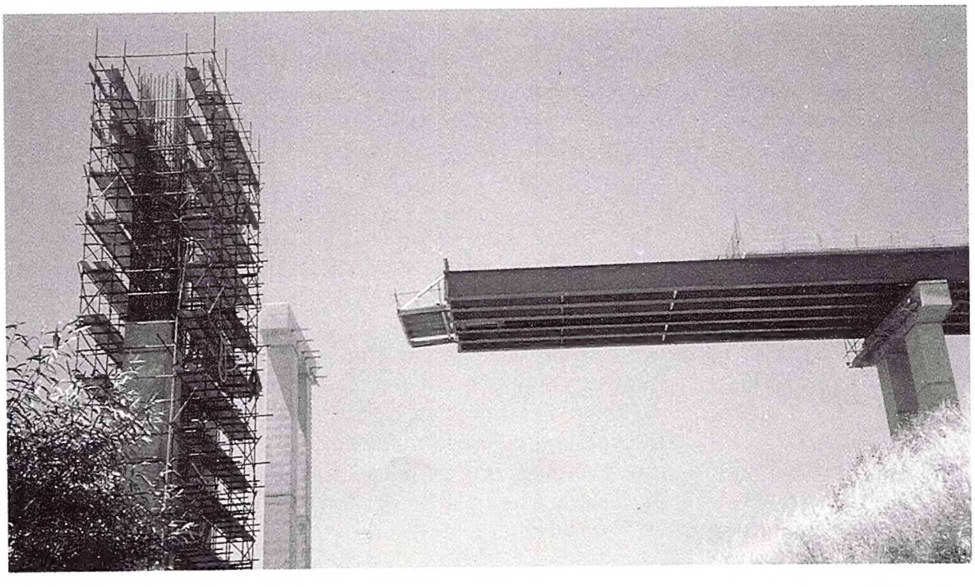
Launching deck over pier 2, east bridge.

"Savings"

Overall, the incremental launch technique offers major savings in time as well as significant cost savings in scaffolding and falsework for concrete deck construction. In fact, at a total cost of less than $6 million the two bridges are, by any standards, an object lesson in cost effectiveness.

Now, after the successful launch at Jacksons Creek, it looks as though bridge-building in Victoria is set to take off.

The bridge contractor was Rowe and Thomas Pty Ltd of Melbourne. ❑



Pier number 2, west bridge, under construction.

Positive Driving

Better judgement is needed by the modern driver, says Dr Max Lay, Director-Technical Resources at the RCA

Drivers today don't seem to realise that it's not a lack of car control skills that causes most accidents - the main culprit is actually the flaws in their driving judgements.

Attitudes of drivers and their ability to quickly and accurately assess traffic conditions have become the most important factors in driving on our modern roads systems.

This is a pronounced swing away from the early days of motoring when the abilities to control and direct the vehicle were all-important. But all too often, we have not learned to put enough emphasis on what is now the most essential element in safe driving - **judgement**.

I believe we give too much emphasis to framing, enforcing, and teaching negative or prohibitive traffic laws and regulations. This drenches drivers with repressive attitudes.

It is as if we believe there are just two purposes for driving: to avoid being caught breaking the law, with its suffering and punishment; and to avoid having an accident and suffering serious personal loss.

Perhaps it's time that we recognised that the real reason most of us drive is to get from where we are to where we want to be, and to do it as expeditiously as possible - trying to minimise our travel time within the constraints of the law, while preserving our safety and security, and keeping down our stress levels. For a few, it seems that driving is an opportunity for personal display.

The modern traffic system requires positive driving from motorists to enable them to use the roads more efficiently. To do this, drivers and educators clearly need to be taught more about how the traffic system functions, particularly signals and signs. New drivers have a number of skills to learn, but the key areas of strategic driving, positive responses and correct risk assessments seem to be underplayed at the moment. So, traffic laws and their enforcement should be directed more towards improving both safety and traffic efficiency.

There would appear then to be a strong need for better liaison between driver educators, police, traffic engineers, researchers and the drivers themselves.

We should all realise that controlling a modern car is relatively easy. Much of what currently passes for driver education is no more than instruction in simple skills to control the vehicle. We become better drivers with practice, gradually building our reflex skills and judgement. As novice drivers we will make errors that won't be repeated so often as we gain driving experience.

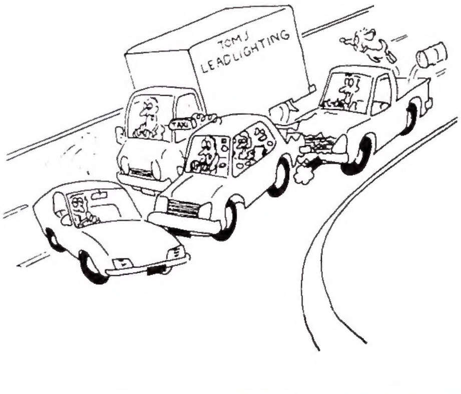
Positive Driving

"Any driver is just one part of an interactive traffic system."

The Basics

The basics of positive driving are the keys to using the crush and bustle of a big-city traffic system. They can be shown in ten areas:

1. To drive strategically, detecting opportunities and hazards as early as possible, with trouble being avoided by planning rather than by reaction.
2. Regularly scanning all parts of the visual field.
3. Assessing the traffic conditions and risks.
4. Driving according to the prevailing conditions, not according to habit.
5. By not driving when alcohol, drugs, fatigue, stress, aggression or illness are likely to impair your judgement or ability.
6. Driving as an exercise in co-operation rather than competition.
7. Being aware of the gaps and head-ways that drivers are adopting.
8. When entering, travelling, or leaving a traffic lane, maintain the same speed as the other drivers. Wherever possible, accelerating or decelerating outside the lane.
9. Keeping to the left, both when travelling straight ahead or when turning left.
10. And, by improving your judgement of traffic movements by understanding the workings of the traffic system.



These skills and judgement techniques of strategic driving and assessing risks should be taught in a structured manner to new drivers. At present, they learn risk assessment mainly through 'fortunate' near misses and minor accidents - a very chancy basis for such an important matter.

The crucial aspects that inexperienced drivers need to pick up as quickly as possible are:

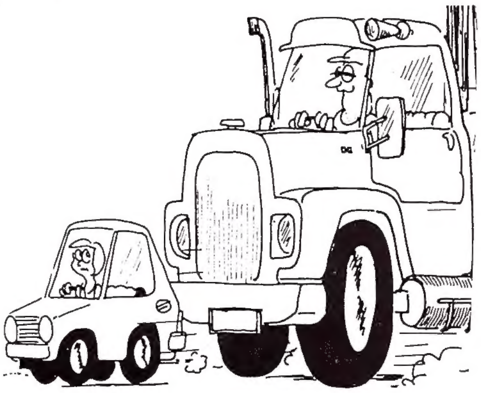
- better scanning of the visual field for relevant cues,
- better judgement of the speed of other vehicles,
- better assessment of available gaps,
- more practice at making quick, accurate decisions on the roads,
- a downgrading of their opinions of their own capabilities.

Over a period of time, these items can be taught; aided, perhaps, by a system of graduated licensing to introduce drivers to more complex situations. For example, new drivers could start with being allowed to drive only in daylight hours with an experienced companion.

Some accidents are chance events, but as many as 90 percent are errors of human judgement, often in quite demanding situations. These errors relate to perception, decision, and response. So our efforts to reduce accidents should be directed strongly at:

- enhancing driver judgement by training in risk-assessment and by publicising the relative dangers of various driving manoeuvres,
- reducing the need to rely on that judgement by increasing the abilities of strategic driving and by designing safer intersections,
- removing the factors that diminish that judgement, such as alcohol, drugs, fatigue, stress, and aggression,
- replacing competiveness with driving co-operation,
- and, education on how the road system functions.

People often advocate as an accident countermeasure that drivers should be taught how to drive out of a skid. The better tactic is to teach them how to avoid getting into a skid. This is not to suggest a return to the worst aspects of negative driving instruction but a plea for a positive approach to avoid problem situations. It would, for instance, involve making drivers aware that different speeds are appropriate in different circumstances rather than the wide-spread mentality of a blanket approach to all violations of speed limits.



Driver Courtesy

Any driver is just one part of an interactive traffic system. The ability to sense that interaction and to co-operate with other drivers is what positive driving is all about. Courtesy is a good indication of the co-operation we need, but we still need judgement. For example, it shouldn't mean holding up a stream of vehicles behind you to give way to a solitary car on your left. While aggression and competition are common factors of our modern society, drivers with these traits have no place on our modern roads.

Motorists are sometimes confused by what they think is inconsistency at intersections. Sometimes, for instance, they get a green arrow and sometimes they don't. It needs to be explained that the computer often makes a green arrow decision based on how many cars are waiting to turn, compared to how many are travelling straight through. If you are one of only a few, you may well be discriminated against.

☞

Positive Driving

"The very people who signs are directed at, are the last to read them."

The computer is not being inconsistent and it isn't difficult to explain its logic to drivers. But do we try?

A knowledge of the average length of time for a green signal (perhaps 30 to 50 seconds on a major approach road) would help drivers judge whether trying to achieve that distant green is worth incorporating into their driving strategy.

A similar issue occurs when the signals are linked together by some form of area-wide control system. The driver gets most benefit from these systems when driving as part of a platoon - that is, a tight group of cars moving in the peak traffic direction - because then the computer is able to progress the platoon with a green light at each intersection. This doesn't work when the platoon fragments, which can be caused by just one person driving below traffic speeds or with an excessive headway.

Negative driving attitudes can lead drivers to believe that they are helping road safety by this type of behaviour, but by creating variations they are actually harming the traffic efficiency. Platooning makes it much easier for other vehicles and pedestrians to cross a road. Of course, any over-reaction to "safe following distance" works against platooning.

Incidentally, in promoting area traffic control, we often don't tell drivers that if they are moving against or across the traffic flow, they may well be worse off than if there was no computer linking.

Traffic signs can often be the cause of major communications gaps between the players in the traffic system.

For example, there is a wide-spread, but totally unsupported belief, particularly in local government, that any traffic problem can be solved by another sign. Unfortunately, the very people at whom signs are directed are the last to read them. In fact, a proliferation of signs normally exaggerates a hazard.

Screening Drivers

It is sometimes argued that dangerous drivers should be detected by a screening process and banned from the road. But even drivers in high-accident categories (in order, young drinking-males, young males, males) have a low accident risk. Most of these relatively risky young males are not going to have a serious accident anyway.

Due to low accident risk, the concept of accident proneness has no relevance in road safety. This is because many people who would qualify as accident-prone would not actually have an accident.

Screening drivers by the use of physical tests, particularly eye tests, is also often argued. But relatively few accidents are caused by people lacking the ability to see - those with defective vision either wear corrective lenses or tend to avoid dangerous situations. Indeed, many accidents involve "looked, but didn't see"; that is, the motorist saw the situation but the proper impact wasn't made on his perception.

Once again, our argument moves away from the physical attributes of the driver towards his judgement, attitudes, and experience.

Overtaking Attitudes

Overtaking, particularly on country roads, is so difficult for most of us that we leave ourselves large margins for error. Nevertheless, research shows that in one out of twenty overtakings, one of the drivers had to do a last instant evasive action to avoid a collision.

The signalling by drivers for overtaking (and the signs, provided by our engineers, for overtaking conditions) falls well short of what should be done. Why do Australians generally take such an aggressive, certainly unhelpful, outlook towards drivers attempting to pass, whereas in countries such as Scandinavia, it is routine to make things easier for the overtaking driver?

Another situation that can readily overtax a driver's concentration is at a complex intersection.

One particularly difficult, that is risky, intersection manoeuvre for many drivers is doing a right turn from a local street onto an undivided road. This difficult multi-task process is shown, by accident statistics, to be messed up all too often.

☞

Caught in the act - a red light camera captures this accident at a Melbourne intersection.

Positive Driving

"The best way to merge with other traffic is to be travelling at the same speed."

To improve the expertise of novice drivers, and the safety on the roads of the experienced drivers, there would seem to be great potential in putting novice drivers into driving simulators to encourage them to 'read' the road scene. Many amusement arcades and PCs now have quite good driving simulators, but do we use them constructively?

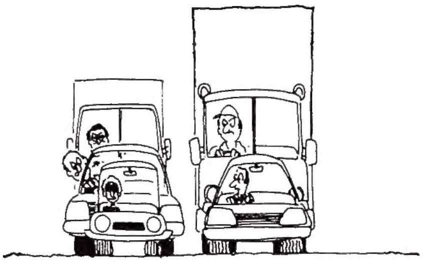
In our calvinistic approach to driving we tend to concentrate on such aspects as keeping at a safe distance from other cars and travelling at a speed that will permit us to stop when some threatening object appears. With positive driving, we learn, quite differently, to see the object as early as possible and to drive around it - concentrating on advance planning, steering, reduced or zero acceleration, while maintaining full vehicle control. Braking is only a final, incidental, and perhaps unnecessary part of this strategy.

Give it a break!

Making drivers believe that brakes are their major safety tool has led to an over-use of braking. But a car being braked is largely out of control and in the extreme will skid. The driver has less options to control the vehicle, and is wasting fuel when he again has to accelerate. A very good driver has a dramatically reduced use of brakes. Professional truck drivers on interstate trips were shown by a recent ARRB study to touch their brakes only once every three kilometres or so.

Similarly, the best way to merge with other traffic is to be travelling at the same speed. Just like jumping from one speeding train to another in the movies - it is an easy stunt if the trains are going in the same direction at the same speed.

But if our driver follows the fearful philosophy of defensively slowing, so he can check that everything is in order before he merges, the difference becomes greater in the relative speeds between himself and the traffic stream he wishes to enter. His task becomes much more difficult and dangerous in terms of physics, space available, vehicle performance and human judgement.



Another major traffic inefficiency is caused by the poor lane discipline of Australians compared to what is expected of drivers on US freeways and European motorways.

Drivers on those systems expect you to keep in your lane, adopt the prevailing traffic speed, signal any lane changes in advance and keep away from the centre lane unless you are travelling at high speed. Australians seem to believe that the slowest drivers should use the lane out by the median strip, even though in most states that's illegal.

Then at traffic signals a similar driving mentality leads to the bulk of drivers queuing in the centre lane, blocking others from entering the right turn slot.

A related situation sees drivers failing to properly use the turning lanes. We place great store on telling motorists about regulations likely to catch them for speeding or drink-driving, but little or none on ways to improve traffic flow.

This inefficient behaviour at signals and intersections shows just how widespread is our failure to educate our drivers properly.

Few drivers even know the law on what to do when they are confronted with a yellow light. And those who once did know have had such fear put into them by the publicity on "red-light cameras" that they no longer have confidence in that knowledge.

What should you do when the yellow comes on at that critical distance? The commonsense thing - the one the traffic engineers use - is to brake if you are able to stop without entering the intersection. If you can't brake safely, keep going across the intersection.

Don't be alarmed if you see the red light before you clear the crossing. The traffic engineer will have left the light sequence on all-red for long enough to give you safe passage. ❑

Serving Our Customers

Residents - considering their needs and attitudes

The duplication of the Princes Highway through Caulfield and Malvern is a good example of the way that the needs and attitudes of the local community have been met in planning, designing and constructing a major road proposal.

The project involves duplicating the Princes Highway between Hawthorn Road, Caulfield and Tooronga Road, Malvern and lowering it under the rail overpass at Glendearg Grove to provide clearance for large vehicles.

Initially, an overpass was proposed for this area, but this was rejected as the local community favoured an underpass design. Concerns were raised about traffic noise and the appearance of an overpass.

Because of the need to reduce traffic noise for residents, timber noise fences have been erected along both sides of the highway.

A high degree of consultation has occurred with local residents, and information bulletins have been prepared and distributed locally.

In particular, there has been extensive consultation on the treatment of side streets which meet the highway. Most of these will be made into courts while access by vehicles into the other streets will be made more difficult by various street treatments. These measures will improve the local environment and provide improved safety for both affected residents and highway users.

Residents, through the Caulfield and Malvern City Councils, have also had a large say in landscaping for the project. A number of affected palm trees have been transplanted to retain the character of the area. Further landscaping of the highway and the local courts will take place.

"Regular information bulletins keep the local community informed of construction progress. Letters are also sent to residents directly affected by construction activity and they are encouraged to call in at the project office to discuss any aspect of the project and to inspect the plans on display," explained Project Engineer, Ian Cossens.

"Project staff are keeping in regular contact with the Councils through bimonthly meetings to discuss progress of the project and aspects of the design," he added.

Car parking has also been provided on the old highway reserve for shoppers using the Glenferrie Road shopping centre.

A Victorian First

The project also uses for the first time in Victoria, "slip form" concrete paving technology.

In this process, the concrete is extruded from the back of a special unit termed a "single lane slip-form paver" and the concrete is saw-cut at certain intervals to create separate slabs. The surface of the concrete is textured to provide a skid-resistant surface and the joints are filled with a silicon rubber compound.

This technology is used extensively in New South Wales, particularly on the Hume Highway.

The contract for the concrete works has been let to Kypreos Civil Engineering Pty Ltd of Sydney.

Completion of the duplication is scheduled for December 1989 at a total estimated cost of $16.2 million.❑

In planning and designing the duplication of the Princes Highway through Caulfield and Malvern, the RCA has been meeting the needs of local residents as well as motorists.

Profile: Punt Road

Punt Road, north of the Yarra River, is one of Melbourne's most notorious bottlenecks.

Because of the severe traffic congestion and poor safety record, the redevelopment of Punt Road between Swan Street and Bridge Road has been listed as one of the highest priority urban road proposals in the Metropolitan Arterial Road Access Study 1987, the Victorian Government's road strategy for Melbourne's arterial roads over the next ten years.

Major benefits resulting from the redevelopment of this major north-south route include:

- reducing the extremely high accident rate (nearly twice the metropolitan average) between the Yarra River and Bridge Road;
- relieving the severe traffic congestion on either side of the Swan Street intersection where traffic volumes are in excess of 90,000 vehicles per day;
- relieving congestion for trams and vehicles in Swan Street and Bridge Road;
- improving access for commuters and goods to and from the city, the northern suburbs and the south and south eastern suburbs;
- reducing traffic on residential streets and secondary arterial roads.

The project provides for:

- upgrading Punt Road/Swan Street and Punt Road/Brunton Avenue intersections and the section of Punt Road under the railway bridge, to improve traffic conditions and reduce delays to trams and buses;
- widening Punt Road on the west side to provide six traffic lanes between Brunton Avenue and Bridge Road; and
- upgrading Punt Road/Bridge Road/Wellington Parade intersection.

Aerial view of traffic on Punt Road.

Punt Road kerblines between the Yarra River and Swan Street intersection will not alter, however, a traffic management scheme will be implemented to improve lane utilisation over this section.

Where possible, design has been modified to minimise the effect on existing elm trees along the edge of Yarra Park. Of the ten significant elm trees affected by the proposal, eight are relocated further back into Yarra Park.

The total cost of the Punt Road widening works is $25 million of which some $8.2 million is for land acquisition and provision of replacement open space, and approximately $6.5 million is for relocation of services.

A liaison committee has been established to ensure that councils are fully informed during the development of design and construction proposals. The committee comprises councillors and officers from the Melbourne and Richmond City Councils, RCA officers and representatives from the Ministry of Transport, Road Traffic Authority and Ministry for Planning and Environment.

The committee provides the opportunity for councils to ensure that their requirements, and those of the people they represent, are taken into account in the detailed design and construction of the road and associated landscaping.

Work on site commenced at the Swan Street intersection in December 1988. The programme for roadworks is as follows:

- Swan Street to Brunton Avenue: December 1988 to late 1989;
- Brunton Avenue to south of Bridge Road: mid-1989 to early 1990;
- Bridge Road intersection: late-1989 to mid-1990. ❑

A Stitch in Time - for Roads

by Warwick Pattinson

Road maintenance in Cusco, Peru.

Australia can learn from a World Bank study of road deterioration in 85 developing countries.

The high priority to asset preservation, as practiced by the RCA, is strongly supported by the World Bank in the study.

A $45 billion loss of road assets has been caused by inadequate maintenance in these countries - a loss that preventive maintenance of only $12 billion would have avoided.

The study shows that if these countries do not improve their programs of road repair, the eventual cost of restoration will increase two to threefold, and they will face formidable obstacles to economic development.

Deterioration

New roads have sharp political visibility, repairs do not. All too often, the road networks in the countries being investigated expanded much faster than their maintenance budgets. Traffic was considerably heavier than expected and axle loads often exceeded the designed capacities of the pavements.

A poor understanding of the implications of this situation had lead many governments to give low priority to road maintenance budgets.

New paved roads, if they have adequate upkeep, deteriorate slowly for the first half to two-thirds of their life, after which the pavements can often wear out quite rapidly.

The cost of operating vehicles and transporting goods then shoots up as the roads become rougher. The road authorities don't come under immediate pressure to improve road conditions, as it is the vehicle operators who pay these costs and pass them on to the public.

Suggestions by the World Bank

Some of the choices that should be examined are:

- gravel roads should be paved only after a budget analysis shows that they can afford to be maintained;
- where the volume of traffic indicates that paving is needed, the pavement design should consider the likelihood of neglect and excessive loads. If this is high, the pavements should be built stronger immediately, rather than in stages, even though this will mean fewer kilometres of new road;
- as the deterioration of paved roads is gradual for the first ten to fifteen years, the resurfacing and strengthening can sometimes be deferred in this stage so long as the road remains in fair condition, and is carefully monitored;
- a detailed knowledge of traffic is critical in maintenance decisions. When funds are tight, it may be best to keep heavily-travelled roads in good condition by re-allocating substantially from the maintenance of those with light traffic;
- if funds are very tight, it can be economic to let lightly-travelled roads deteriorate, with only minimal upkeep to keep them usable;
- even if funds are not tight, it may make little economic sense to fully restore paved roads that are lightly travelled.

According to the World Bank, gravel roads should only be paved if a budget analysis shows that they can afford to be maintained.

The World Bank stressed that a road agency needs an effective information system to monitor traffic, road conditions, and, just as importantly, its internal workings. With that information, it can prepare accurate analysis of road life-cycle costs. It needs, quite simply, an accurate data base and capable staff.

Best Value

To ensure that the best value for the construction dollar is gained, the road agency needs accountability systems for performances, both within the agency and by contractors. And, it must work with media and non-government organisations to make the public conscious of the high costs of neglecting roads maintenance.

The message for Australia is clear: we must continue to protect the massive investments in and asset of our roads systems, with adequate maintenance supported by a pavement management system. If not, we could see deterioration escalate as old pavements crumble and new ones degenerate. In that situation, the costs to return them to good condition would jump alarmingly. ❑

Warrick Pattinson is the RCA Manager - Freight and Vehicle Limits

Labour-based road construction in Lesotha, Africa.

Road damage in Swaziland after a cyclone.

Bell Street-Banksia Street Link Underway

Preliminary work has began on the eagerly awaited road link between Bell and Banksia Streets, in Heidelberg.

The $26 million link will be built by the RCA in two stages, the first being the duplication of Banksia Street between Cape Street and Studley Road.

Stage two, the connection between Banksia Street at Studley Road and Bell Street at Myrtle Street, will start in late 1989, and the entire project is scheduled for completion in late 1991.

The RCA will be conducting a series of meetings with residents near Banksia Street to allow discussion about the work and important local issues, such as landscaping and noise attenuation.

When completed, the link will reduce traffic in the overburdened Burgundy Street and local residential streets.

A major improvement proposal listed in the State Government's Metropolitan Arterial Road Access Study (METRAS, April 1987), the link will provide better access to the local area, particularly the Heidelberg Shopping Centre in Burgundy Street.

A portion of the parkland at the rear of the Austin Hospital will be needed for the road reservation, although the Government is committed to replacing the land elsewhere in Heidelberg.

Extensive consultation has taken place between the RCA and Heidelberg City Council in preparation of plans for the link. ❑

On the road

The RCA is promoting motoring trips through scenic areas and places of interest in Victoria.

Many of the trips can be undertaken over a full day, or incorporated as part of a longer trip during an extended travelling holiday.

Viewing areas, wayside stops, picnic and barbecue areas have been provided by the RCA along many scenic and tourist routes to assist travellers in enjoying the scenery while having a break from driving.

Left: *The Alpine Road, Australia's highest all-year through road, offers some breathtaking views.* ***Inset photo:*** *bridge over Ovens River, Porepunkah.*

A Bright Idea

Avenues of colourful, deciduous trees greet the motorist driving into Bright, a great place to visit if you want to soak up some invigorating alpine air.

Located a little more than 300 kilometres north-east of Melbourne, the town nestles in the Ovens Valley amid some stunning scenery.

From Bright, roads radiate to Mt Hotham, Mt Buffalo and Falls Creek, and there are a numerous range of ski hire shops available.

Often called the tourist centre of the Ovens Valley, Bright boasts a number of places to stay, though it may pay to make a booking during the ski season.

But the fun isn't just confined to the slopes around Bright. There are a number of scenic walks in the area which are marked by direction signs, including the Canyon Walk and Clear Spot.

Every year during late April the community holds the Autumn Festival which features concerts, live bands and stalls as part of the day and evening entertainment.

Less than an hour's drive away is the historic town of Beechworth, Victoria's best preserved gold town.

Getting there

Travel the Hume Freeway to Wangaratta where you join the Ovens Highway. The drive to Bright is about 60 minutes. You can also turn off the Hume on the newly opened Glenrowan Bypass and follow the Glenrowan-Milawa Road. Many travellers also prefer the Melba/Maroondah/Midland routes to Benalla.

If you have the time, you can return on the much longer but visually pleasant Alpine Road to Omeo. It is the highest all-year through road in Australia and reaches more than 1800 metres at Hotham Heights. There are some spectacular views of the Alps and the road, although mainly unsealed, is suitable for all vehicles.

From Omeo, the motorist follows the Omeo Highway to Bairnsdale and then back to Melbourne via the Princes Highway.

In winter, both the Alpine Road and Omeo Highway are cleared of snow by the RCA, although chains may be necessary.

The town of many colours - Bright is famous for its elms, apple orchards, poplars, willows, maples and figs which come alive in autumn and spring.

Along the way

Ovens Highway

Myrtleford: sits at the foot of Mt Buffalo and is home to three hotels and two motels. Trout fishing is a big attraction on the Ovens River and its four nearby tributaries.

Lake Buffalo: located south of Myrtleford, popular for fishing and water sports.

Mt Buffalo National Park: access is via a sealed road from Porepunkah. It attracts visitors year round and camping is allowed in summer, although sites must be booked.

Porepunkah: 6km north-west of Bright. Sits at the junction of the Ovens and Buckland Rivers.

Alpine Road

Harrietville: sits at the entrance to Mt Hotham. Offers bushwalks, horse -trail rides and fishing.

Hotham Heights: Australia's highest ski village has well groomed runs, nine ski-lifts and well-developed cross country trails.

Omeo Highway

The highway, which is partly unsealed, links the Princes Highway with the Murray Valley Highway.

Omeo: historic gold-mining town which today attracts visitors keen on trout fishing, fossicking for gemstones and bushwalking. The town has good shopping facilities and accommodation.

Take a break

It is widely recognised that driver fatigue is a major contributory factor in accidents on rural highways and freeways.

Have a rest before driving long distances or after skiing. If this is not possible, rotate drivers and avoid eating large meals or drinking alcohol before heading off.

RCA rest areas, wayside stops, scenic viewpoints and parking bays are provided on many major roads at appropriate locations to give drivers and passengers the chance to take a break from the concentration of long distance driving. ❑

New options for restoring those

Old Timber Bridges

By Bruce Day
Specialist Consultant, Hardcastle & Richards Pty Ltd.

A new era for the timber bridge is coming in Australia. I like to call it the era of the "permanent" timber bridge.

Often regarded as cheap temporary structures which provided an acceptable level of service until a more "permanent" bridge could be built, it is not surprising that little attention had been given to improving the durability of timber bridges by amending the design. But the National Trust and the Historic Buildings Council has focussed a lot more attention on the need for preserving existing bridges. It has demonstrated that the required durability for a permanent bridge can be built into a new timber structure or the restoration of an existing one.

This makes good sense, as these bridges are more energy efficient. The cutting of timber requires much less power than making concrete or steel - and timber is a renewable resource. At Kerang new timber bridges are being built at less than a third the cost of concrete, but of course Kerang is in the heart of the red gum district.

Victoria still has about 3000 bridges of timber - they are being replaced at about 30 a year, a steady trend in some areas. A trend that I hope will change. NSW and Queensland have the most timber bridges in Australia, with about 5000 each. The largest of their type being the long-span truss bridges of NSW.

Though there are timber bridges in Europe up to 400 years old, the plentiful supply of durable timber in Australia allowed us to not be overly concerned in having to rebuild structures. A bit like Paddy's axe, it wasn't difficult to replace a part or two when the need arose.

The various options available to the restorer today can extend the bridge's life to possibly 50 years or more.

A Short Term Answer

Faulty members may be replaced with non-durable timber. This is a short-term solution, warranted only if the bridge is to be replaced within the life of the replacement members - which could be five to 15 years.

Non-durable timber with preservative treatment may be used. With the cost of replacing a faulty member in a bridge being three to 10 times the cost of the timber only, it is clear that the use of non-durable untreated timber in repeated maintenance, which has to be repeated every few years, is not economical.

The use of preservatives improves the durability of the treated member, but not the rest of the structure.

Pressure preservative treatment can give deep penetrations in softwoods, but only limited depth in hardwoods. In restoration works, members are cut to fit, drilled and trimmed to suit the existing parts. This usually exposes untreated timber in holes, ends of members and at joints - locations where the deterioration is likely to be the most rapid. This problem can be alleviated by using brush-on preservatives on site after all the drilling, cutting and trimming has been done. Brush-on coatings are inferior to pressure-treated coatings, so great care is needed in this work.

Using *durable* timbers provides a further improvement, particularly if durability Class 1 timber is available. Generally, such timbers are available in Australia (in most of the sizes used in existing bridges) but not necessarily in Victoria. Procurement is relatively easy, if a reasonable period is allowed for the supplier to locate the trees, log them and convert them into ordered sizes.

However, the use of durable timbers with vulnerable areas treated reduces the deterioration of both the new and existing members at high-risk points: generally where members are in contact with each other, or the ground (except when continually wet), and at the exposed ends.

Using preservative fillers in joints and between members, nail plates, and covers on the ends is usually effective in slowing deterioration rates at these points. Special attention to these areas during a maintenance operation is usually cheap, simple and can produce gains which are very cost-effective.

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Fog-shrouded Buchan River Bridge near Buchan in eastern Victoria.

New options for Old Timber Bridges

Worker on Winnot's Creek bridge on the Cann Valley Highway.

Waterproofing of treated areas is a practical option since it allows members to be fitted, then the vulnerable areas treated and waterproofed on site. Waterproofing is based on the knowledge that timber will last indefinitely in two environments - when kept continually dry or continually wet. Most of the timbers of our bridges are sometimes wet and sometimes dry, just ideal for fungal attack. The rate of deterioration appears to be directly proportional to the time they are wet or moist, so contact surfaces deteriorate faster than exposed faces.

Waterproofing techniques used in the past have been highly successful, the simplest being the use of roofed bridges in Europe and USA.

With modern materials it is possible to waterproof joints with compressible foams impregnated with preservatives and to seal decks with elastomeric membranes.

Concrete deck overlays have been used successfully in Western Australia for more than 15 years and have recently been used in Victoria by the RCA and my firm. Of course most structural concrete is not waterproof, but will substantially reduce the time the timber is wet.

Deck waterproofing has the added advantage of protecting all the superstructure and part of the substructure against fungal attack. Elastomeric layers have a limited life, but if the arrangement is designed properly, it can be replaced at minimum cost without replacing members.

In restoration works durable timber with preservative treatment is rarely available, since each member is usually made to fit a specific location. This would involve fitting the member, then taking it to a pressure treatment plant to treat it with preservative before finally fitting it to the structure.

This type of operation may be feasible where a whole part of the structure (such as the deck) has to be replaced.

Maximum durability and minimum maintenance costs are given by using durable timber which is pressure treated, with the vulnerable areas waterproofed.

This still has the disadvantage of needing to fit the member first, then having to send it away for pressure treatment. For most bridge sites this system is not practical.

Cost of bridge restoration

If a bridge is still usable without danger to traffic, restoration costs can be 10 to 30 percent of the cost of complete replacement with a reinforced concrete structure.

The 30 percent cost will usually give an extended life of 30 or more years.

A recent example (using the option of durable timber with vulnerable areas treated and waterproofed) cost approximately $260 per square metre. This included a reinforced concrete overlay which extended the width of the deck by approximately 800mm.

Cyclist on bridge on the Tubbut-Bonang Road, north of Orbost.

The life extension of this bridge to the time when further major work will be needed is expected to be at least 30 years. If any further work is required it is likely to be for members, such as piles, which were not replaced during the restoration works.

There are many timber bridges on unclassified roads which carry limited traffic of a slow nature. These perform their function so satisfactorily that it is difficult to economically justify their replacement with concrete structures.

Other reasons may justify replacement - alignment, site distance and other road geometry factors. Even allowing for the number of bridges where these geometrical factors are a problem there will be many which do not warrant replacement.

Restoration, or even new timber bridges, will often be more cost-effective.

Timber bridges have a charm and an eye-appeal that cannot be ignored. They should be retained where possible, for they give a little extra support for the all-important tourist dollar. ❑

About the author

Since 1977 Bruce Day has been an executive engineer with the consulting engineering firm Hardcastle and Richards Pty Ltd.

A project consultant on a number of road, bridge, building and industrial projects, he has carried out design for the wharf and supply base for the North-West Shelf Project.

Previously working for the Forests Commission of Victoria, Melbourne and Metropolitan Board of Works, and the Country Roads Board, Bruce has had wide experience in the design of bridges in timber, reinforced and prestressed concrete and steel.

His special skills include the design and use of elastomeric bearings for bridges, the aesthetics of bridges, road design of structures associated with highway works, plus the design and restoration of timber structures.

Bruce is a member of a number of professional associations and has presented many papers and lectures in his area of expertise. ❑

You may think this looks old: throughout Europe there are timber bridges dating back more than 400 years.

Bypass takes Calder Traffic out of Gisborne

State Transport Minister, Mr Jim Kennan, and Federal Minister for Land Transport and Shipping Support, Mr Bob Brown, jointly opened the 6km Gisborne freeway bypass on 17 March.

The $25 million bypass marks an important stage in the strategy to duplicate the Calder between Melbourne and Bendigo.

By the late 1990's motorists should be able to complete the 140km journey on a fully divided highway.

Each day approximately 10,000 vehicles have been passing through the Gisborne town centre with much of this traffic bound for Bendigo and beyond. Removal of this traffic will make Gisborne's streets safer for pedestrians and create a more pleasant environment for people to go about their business in this developing municipality.

At the same time, the bypass will significantly reduce the accident rate on a busy section of the vital road link between Melbourne and north-western Victoria.

"Calder Highway travellers will welcome the opening of the bypass which will provide a safer, uninterrupted route away from the centre of Gisborne," Mr Kennan said at the opening function.

"As a result, average travelling times between Melbourne and Bendigo will be reduced by as much as 10 minutes.

"A feature of the bypass is the spectacular twin bridge structure across Jacksons Creek which is sure to become a landmark for the Gisborne area."

The RCA has undertaken extensive landscaping and noise reduction works to ensure the new route does not cause excessive visual or noise intrusion.

Many thousands of native trees and shrubs are being planted to complement the existing local species and to ensure the bypass blends in with the local environment.

Construction of the Calder Highway bypass of Gisborne was funded under the Federal Government's Australian Bicentennial Road Development Program and the Centennial Roads Program. ❑

Keeping Track

What's happening on the roads

Highway Bypass opens at Dimboola

The streets of Dimboola are much quieter now. The shoppers in the town centre notice it, the patients at the town's hospital on the main road notice it, as do the local dogs, which now have to content themselves with chasing hapless schoolkids on bikes instead of the gargantuan freight trucks which used to thunder through the town.

The long-distance through traffic is now a thing of the past for Dimboola, a town of 1800 people in Victoria's north-western wheat belt. It's located 330km north-west of Melbourne, approximately halfway between Melbourne and Adelaide on the Western Highway.

The two-lane, two-way bypass extends 5.6km from Kornheim Road, east of the town, and rejoins the 'old' Western Highway at Rainbow Road.

A section of the Borung Highway terminating at Dimboola has also been re-aligned as part of the works.

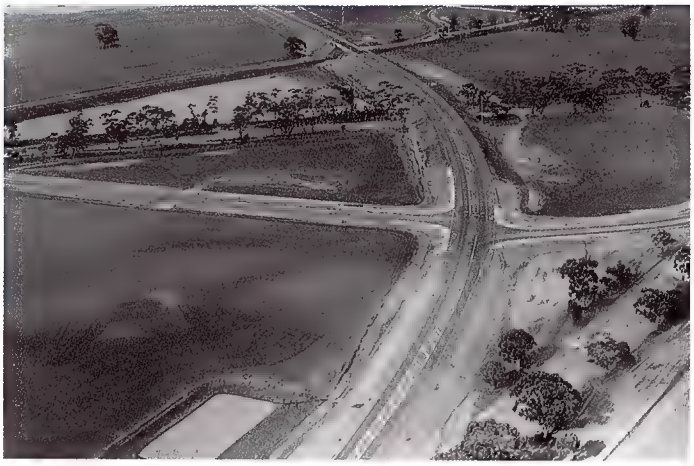
The project was commenced by the RCA in 1987 and is part of a planned upgrading of the Western Highway to National Highway standards.

A bridge carries the new bypass route across the Melbourne-Adelaide railway line, eliminating the last remaining level crossing on the Western Highway, in Victoria.

Provision of the bypass will greatly improve driving conditions for interstate travellers.

Funding for the bypass was provided through the Federal Government's Australian Bicentennial Road Development Program. ❑

Chairman and Managing Director of the RCA, Mr Ian Stoney, addresses the gathering at the opening of Dimboola Bypass.



Bird's eye view of the Bypass.

Earthworks in progress on Ballarat Bypass

A $3.5 million earthworks contract for the Ballarat Bypass commenced in early March.

Cook's Constructions Pty Ltd was awarded the contract to undertake earthworks, drainage and pavement construction on a section of the first stage of the bypass between Slatey Creek Road and Forest Street.

The contract also involves some works for the ramps and bridge approaches for the Midland Highway interchange.

The first stage of the $60 million bypass between Woodmans Hill and Burrumbeet is scheduled for completion by 1994. More than 6,000 vehicles per day will be removed from Ballarat's city centre when the route is completed, which will significantly ease traffic congestion.

The Bypass will form part of the National Highway Route between Melbourne and Adelaide, with funding for the project being provided under the Federal Government's Australian Centennial Roads Development Program. ❑

Bike lanes extended on Bellarine Highway

Students from Leopold Primary School recently 'road tested' eight kilometres of bicycle lanes on the Bellarine Highway, which have just been completed by the Road Construction Authority.

More than a hundred students rode in convoy from Leopold to Moolap and return, along the bike lanes, as part of their Bike Ed course.

RCA Barwon Regional Manager, Mr Colin Kosky, flagged off the students at the start, to mark the official opening of the lanes.

The RCA commenced construction of the Leopold-Moolap bicycle lanes in January and the work has been completed at a cost of $166,000.

In addition to widening the road pavement by two metres to accommodate cyclists, edgelining and signing has been carried out to clearly designate the route. ❑

Keeping Track (continued)

Peninsula Freeway duplication completed

Motorists travelling between Mount Martha and Dromana are now able to make the journey under full freeway conditions following the completion of the Mornington Peninsula Freeway Duplication in May.

The opening completed the Mount Martha-Dromana section of the freeway which was initially opened as a two lane undivided route in 1984.

A deviation of the Nepean Highway at Mount Martha now takes traffic over the freeway via a new four span bridge and traffic interchange and provides access to the south bound freeway carriageway. This interchange will come fully into service in 1991 when the remaining 5km freeway link between Mt Martha and Moorooduc South is completed.

Duplication of the Mount Martha - Dromana section will greatly improve traffic movement on the Peninsula and ease frustrating delays experienced especially during busy summer holiday periods.

Most importantly the separation of traffic flows will greatly reduce the accident potential of this busy route. This work is part of an ongoing program to improve Peninsula roads which will benefit both tourism and residential development in coming years.

When the freeway link between Mt Martha and Moorooduc South is completed, motorists will be able to travel on a fully divided road from Springvale Road to Rosebud.

Duplication of the Mornington Peninsula Freeway has been jointly funded by the State Government and from the Federal Government's Australian Bicentennial Road Development Program. ❑

New section of the Mornington Peninsula Freeway.

Minister for Transport, Jim Kennan, cuts the ribbon at the Mornington Peninsula Freeway.

Minister digs in to start Western Ring Road

Transport Minister, Jim Kennan kicked off work recently on Melbourne's planned Western Ring Road when he took the controls of an excavator to start work on the 8.5km section through Broadmeadows, which will link the Tullamarine Freeway and the Hume Highway .

"For the first time, talk of a Ring Road in the west and north-west by successive governments and planners, which has taken place over many decades is finally being transformed into action," Mr Kennan said.

"For people living in the area, the Ring Road will remove thousands of trucks and other vehicles each day from Pascoe Vale Road and other local arterial roads.

"Residents will benefit from reductions in congestion, noise and pollution as through traffic is diverted away from their streets onto the new route making local streets much safer for both pedestrians and local traffic," he added.

"Just as importantly, Victoria's economy will benefit by the much improved passage provided for road freight through Melbourne's north-western suburbs which will open up these areas for greater industrial development.

"Construction of this $135 million four lane divided road link is the first stage of a planned 40km-long route which will eventually link the Geelong Road, Western, Calder and Tullamarine Freeways along with the Hume Highway and Greensborough Bypass.

"By late 1992 the Broadmeadows section of the Metropolitan Ring Road will be carrying up to 50,000 vehicles per day, providing a direct road link for motorists and commercial traffic travelling between the Tullamarine Freeway and the Hume.

"The work which is commencing today involves earthworks, drainage and construction of embankments for a traffic interchange between the Ring Road and the Tullamarine Freeway.

"Twin bridges will be built to carry traffic lanes over the freeway with ramps giving access onto and off the Ring Road.

"The route will underpass Pascoe Vale Road, the Jacana rail lines and Electric Street, while at the eastern end a flyover will carry the route across the Hume Highway before linking with Mahoneys Road at Campbellfield." ❑

Princes Fwy Duplicated to Bunyip River

Motorists travelling the Princes Highway between Melbourne and Traralgon will now make more than 80% of the journey on a fully divided highway following completion of the highway duplication between Garfield and Bunyip River.

State Transport Minister, Jim Kennan, and Federal Minister for Land Transport and Shipping Support, Bob Brown, jointly opened the $15 million project on the 2 June.

Upgrading of this 8 km of the highway completes the Princes Highway - Tynong section, the first stage of which was duplicated in 1987.

"The Princes Highway provides principal access between the Melbourne metropolitan area and important industrial, farming and tourist areas of the Latrobe Valley and East Gippsland," Mr Kennan said.

"The State Government has placed a high priority on improving this important National Route as evidenced by this duplication and other works in progress such as the Morwell Bypass and the Genoa River crossing.

"Over 10,000 vehicles per day use this section of National Route 1 including a high percentage of commercial traffic".

By the year 2000 this traffic volume is expected to almost double as a result of the expected growth in tourism, industry and farming predicted for East Gippsland and the Latrobe Valley.

The Road Construction Authority has designed and built this project to blend with the local environment.

Landscaping is underway to minimise visual intrusion and to preserve the existing character of the area.

Funding for the work has been provided under the Federal Government's Australian Land Transport Program and from Bicentennial road funding. ❑

Mr Bob Brown makes a point at the opening.

What's happening overseas!

UNITED STATES

Even though drivers aged 75 years and older are more likely than others to be involved in serious car accidents, a US report says that there "is no justification for restricting driving on the basis of age alone".

The report is the result of a two year study by the US National Academy of Sciences.

The study shows that in America about 3% of all drivers involved in fatal crashes are 75 years or older, but concluded that age alone is a "poor predictor" of an individual's performance.

The study argues that highway safety should be improved by making adjustments in the design of roads and signs, and recommends adapting license screening tests to better identify people of ALL ages who have impairments that affect their driving.

NEPAL

A 180km road will be built over the next 2 years to provide access to the remote Arun River hydroelectric project - not all that far from Mt Everest in the Himalayas. Engineers on the project know that altitude sickness will be just one of the problems they will endure during construction - the road passes through exceptionally difficult terrain.

A two-stage pre-qualification process has been initiated to make sure that the contractors on the job know what they are doing, and they will be asked to provide a detailed method statement spelling out exactly how they propose to carry out construction of the access road.

GREECE

The Ministry of Public Works of Greece is planning a 32km highway linking Athens to a new international airport at Sparta. Construction is starting this year on the $137 million highway and authorities plan to have the airport, and the highway, completed before the 1996 Olympic Games, for which Greece is bidding.

BRITAIN

*A $7 million computerized traffic warning system, designed to prevent multi-vehicle pile-ups forming after individual crashes, is being tested on the M1 Motorway. The system relays information to drivers at one-kilometre intervals and shows a 50 speed limit whenever queue detectors buried in the pavement identify slow moving or stationary traffic.

*The British Government has approved plans to build a $330 million bridge over the Thames in East London to provide a new road link between Beckton and Falconwood, and improve access to the Docklands. The dual three-lane bridge will also incorporate a separate cycle path.

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HONG KONG

Hong Kong's Cross Harbour Tunnel is now carrying 117,000 vehicles daily, making it the most heavily travelled tunnel in the world.

The tunnel was designed for a capacity of 80,000 vehicles daily, and peak hour traffic has spread until the tunnel is as busy at three o'clock in the afternoon as it is between seven and nine o'clock in the morning.

FRANCE

Autoroutes du Sud de France (ASF), who operate the longest system of toll roads in France, has placed in service a system of toll booths on the toll plaza in Vienne, south of Lyon.

This barrier-type toll plaza, the largest in Europe, accommodating 17 million vehicles a year, is at the head of a road network which serves the Rhone Valley and the Mediterranean shore, the favorite vacation area for much of Europe. Traffic through the plaza reaches a daily average in July and August of 80,000 vehicles per day, or five million in two months.

The system in use in Vienne consists of an exit barrier with 28 lanes.

JAPAN

After ten years of construction work and billions of dollars, the world's longest bridge has been opened, linking Japan's four largest islands. Known as the Seto Bridge, it is a two-tier highway with four lanes spanning 13.1 kilometres. The bridge enables people to cross between the islands of Shikoku and Honshu in eight minutes, where previously it took an hour by ferry to cross the Inland Sea.

WORLD FACTS

The number of cars, trucks and buses in the world has reached 514 million, says the Automobile International magazine, "World Automotive Market". Of this total, 176 million are located inside the United States. Production of vehicles increased by one per cent to 45.6 million units in 1987, despite decreases in Japan and the US. There were big increases in vehicle production from South Korea, Taiwan, South Africa, Yugoslavia and Argentina. ❑

Towards Better Roads

Major projects on Victoria's urban and rural roads...

Barwon River Crossing - Geelong

Work recommenced in early May on the Barwon River Crossing which forms part of the La Trobe Terrace Project.
Cost estimate: $18 million
Completion expected: mid 1990

Bell Street-Banksia Street Link - Heidelberg

Work has started on the road link, a four lane divided road, between Bell Street and Banksia Street in Heidelberg. The project will take three years to complete and initial works are associated with Stage One: duplicating Banksia Street between Cape Street and Studley Road, which is expected to be completed in December 1989. Work on the major cutting and retaining walls west of Studley Road is expected to begin in early 1990.
Cost estimate: $29 million
Completion expected: late 1991

Bright Road

Bridge construction has started on a 3-span concrete bridge over the Ovens River near Myrtleford (RCA's North Eastern Region).
Completion expected: August 1989

Calder Highway - Gisborne

The bypass of Gisborne, which extends from McGregor Road to Mt Macedon Road, was opened in March, 1989. Cost: $26 million

Cohuna Main Road - Echuca

Work on the Warren Street Bridge over the Campaspe River is continuing under a second contract (Northern Region and City of Echuca).
Cost estimate: $227,000
Completion expected: September, 1989

Greensborough Bypass

The 3.5km first stage of the Greensborough Bypass between Grimshaw Street and Diamond Creek Road has been opened to traffic since early 1988.

Work, including pavement construction, is nearing completion on the section between Yallambie Road and Grimshaw Street. The rail tunnel near Watsonia Railway Station has been completed and construction of a pedestrian overpass at Nell Street has commenced.
Cost estimate: $32 million
Completion expected: August 1989

Heathcote-Nagambie Road

Chinamans Bridge

Construction is proceeding on the 127 m, 5 span concrete bridge over the Goulburn River near Nagambie (North Eastern Region).
Estimated cost: $2.1 million
Completion expected: October 1989

Hume Freeway

* ***Creightons Creek*** to Euroa

This 5km section, costing $8 million, was completed in December 1988.

* ***Euroa Bypass***

The bypass extends from the Western Interchange to Cemetery Lane and earthworks along this 8km section commenced in May 1989.
Estimated cost: $29 million
Completion expected: 1992

* ***Euroa to Balmattum***

Earthworks along this 8km section are progressing, and bridges and major culverts have been completed.
Estimated cost: $16 million
Completion expected: mid 1990

A horse-drawn coach was part of the colourful opening ceremony at Glenrowan.

* ***Glenrowan Bypass***

This 12.5 km was opened to traffic on 20 December, and extends from Chivers Road, Glenrowan West, to the Wangaratta South Interchange.
Cost: $31.5 million

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Towards Better Roads (continued from p.23)

Hume Freeway (continued)

**** Wangaratta Bypass***

Earthworks, drainage and lower sub-base paving are nearing completion between Fifteen Mile Creek and the King River. Construction of the Wangaratta-Whitfield Road overpass bridge began early in 1989. Earthworks are expected to commence on the King River to Reedy Creek section late in 1989.
Estimated cost: $75 million
Completion expected: early 1995

**** Bowser to Springhurst***

This 12 km section of duplicated highway from Bowser to Springhurst, including 7.5 km of access road, is scheduled for opening in July 1989. Estimated cost is $13 million.

**** Springhurst to Chiltern***

This 5.5 km section from Horns Road to Adams Road will be opened to traffic in April 1990. Estimated cost is $7 million.

The next 3.5 km section southwards to Springhurst will begin in November 1989 and will open to traffic in early 1991. Estimated cost is $5.6 million.

**** Chiltern to Barnawartha***

The 12 km section of freeway was opened to traffic in September 1988 at a cost of $17 million.

**** Barnawartha Bypass***

The 3 km section of divided highway from Cemetery Lane to Mt Lady Franklin will have a staged opening, with the major length to open in December 1989 and the other section to open in April 1990. Estimated cost is $8 million.

Loddon Valley Highway

Work on replacing the superstructure of the Jobs Gully Railway overpass bridge, between Bendigo and Eaglehawk, began in May, 1989.

The timber decked, wrought iron beams and the steel framed pier are being replaced by a single span prestressed concrete structure.
Cost estimate: $150,000
Completion expected: July, 1989

Loddon Valley and Murray Valley Highways

Work at intersection, south of Kerang, plus widening and resheeting of approaches was completed in May 1989 at a cost of $300,000.

Mornington Peninsula Freeway Extension

The second carriageway from Mount Martha to Dromana was completed and opened to traffic in May, 1989.
Earthworks are progressing on the freeway section between Moorooduc Road and Mount Martha.

Murchison Road - Goornong
Replacement of Butchers Bridge over Mt Pleasant Creek with a 3 span reinforced concrete structure (RCA Northern Region and Waranga Shire).
Cost estimate: $150,000
Completion expected: June 1989

Princes Freeway (East) - Morwell Bypass

Earthworks are now completed for Stage 1 between the Morwell River and the Midland Highway. The final two bridges on Stage 1 are now under construction. Work will start on Stage 2 of the bypass between the Midland Highway and the eastern interchange in December 1989.
Cost estimate : $31 million (Stage 1)
$18 million (Stage 2)
Completion expected : April 1990 (Stage 1) Mid-1992 (Stage 2)

The new river crossing at Genoa, in East Gippsland.

*** Tynong**

The final section of the duplication of the 16.7km section from Nar Nar Goon to Bunyip River was opened to traffic in June, 1989. Cost estimate: $32 million

Princes Freeway (West)

*** Forsyth Road Overpass**, Hoppers Crossing

Two bridge are being built: one over the Princes Freeway and the other over the Melbourne-Geelong railway line. Bridge construction is prestressed concrete beams cast in reinforced concrete deck with reinforced earth retaining structures. The southern ramp approaches were opened to traffic in February 1988 to provide freeway entry and exit points at this location.
Cost estimate: $6.2 million
Completion expected: December 1989

Princes Highway (East)

*** Brodribb River Bridges**

Work is continuing on the construction of two reinforced concrete bridges over the Brodribb River and flood plain east of Orbost. The new bridges on an improved highway alignment will replace the two existing old timber structures.
Cost estimate: $3 million
Completion expected: mid 1990

*** Dandenong Road** - Caulfield/Malvern

Work is continuing on the duplication between Hawthorn Road and Tooronga Road. Paving works have commenced and noise attenuation fences have been erected.
Cost estimate: $16 million
Completion expected: Late 1989

*** Genoa River Crossing**, - Genoa

Work on the Genoa River Crossing Project will provide a flood free crossing of the Genoa River flood plain. The project consists of replacing the existing timber bridge and substandard road alignment with four prestressed and reinforced concrete bridges and 3.5km of realignment. The $7.5 million project will be open to traffic in July of this year.

Punt Road - Melbourne/Richmond

Work has started on the widening of Punt Road between Swan Street and Bridge Road.
Cost estimate: $25 million
Completion expected:
Swan St to Brunton Ave: late 1989
Brunton Ave to south of Bridge Rd: early 1990
Bridge Rd intersection: mid 1990

Pyrenees Highway - Newstead

Construction of a new bridge on the highway over the Loddon River at Newstead is in progress.
Cost estimate: $1.6 million
Completion expected: April, 1990

South Gippsland Highway - Cranbourne to Lang Lang

Work has been completed on duplicating the highway from Cranbourne to Five Ways, Tooradin to Dalmore Road, and Yallock Creek to the Bass Highway. Work is continuing on the remaining sections.
Cost estimate: $26 million
Completion expected: mid 1990

Wells Road Duplication

In December the RCA completed the duplication between Bowen Road, Braeside and Springvale Road, Aspendale. Work is now progressing on the construction of a new bridge over Mordialloc Creek.
Completion expected:
Bowen Road to Governor Road: mid 1991
Bridge over Mordialloc Creek: mid 1990

Western Freeway - Ballarat Bypass

Work has commenced on the 26km bypass between Woodmans Hill and Burrumbeet. Initially, a two lane, two way carriageway will be constructed with interchanges at Woodmans HIll, Daylesford Road and the Midland Highway. An overpass is to be provided at Lofven Street with grade separation of the Mildura and Adelaide railway lines. At grade intersections will be constructed at Swinglers Road, Gillies Road and the Sunraysia Highway, and Brewery Tap Road intersection will be upgraded.
Estimated cost: $65 million
Completion expected: 1993/94

Western Highway - Dimboola Bypass
The 5.6km Dimboola Bypass was opened to traffic in May, 1989, and cost $5.3 million. ❑

Aussie Machine to Recycle Roads

A Melbourne company has developed a unique machine that will save taxpayers millions of dollars a year on road maintenance.

The 35 tonne machine removes the failed pavement, grinds it up, mixes in a binding emulsion and relays the material back onto the road surface - all in a single operation.

"The Road Recycler, as the million dollar machine is called, represents a significant advance in Australian roadmaking technology" says its designer, Mr Kenn Hall, of Road Recyclers Pty Ltd.

"Traditional road reconstruction methods use all new materials, which is good for the quarry industry but bad for the environment" says Kenn.

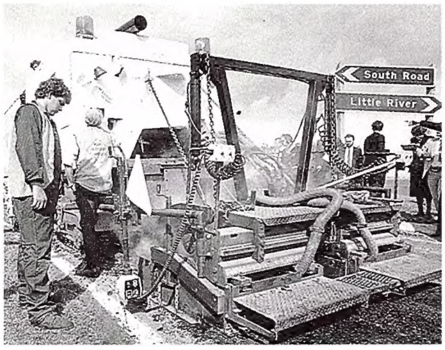
"By recycling existing road materials, the savings in materials, energy and labour will amount to millions of dollars a year.

"This is particularly important when the budgets of all State road authorities and municipal councils are stretched to the limit" he said.

According to Kenn, if just one percent of Australia's road maintenance was carried out by the "Road Recycler" the savings would be in the order of $8 million per annum.

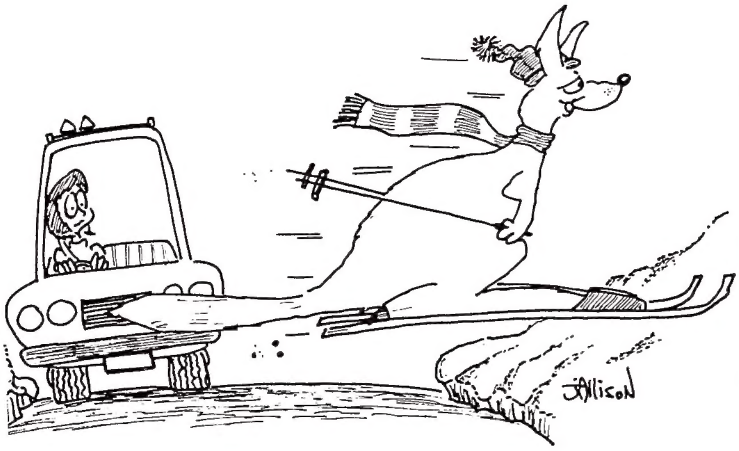
The Recycler has been developed with financial assistance of the Federal Government and technical input from the RCA.
Spiralling costs hitting all authorities involved in road maintenance prompted Kenn to design and build the machine.

Likely buyers of the machine include government authorities and road construction contractors both in Australia and overseas. ❑
Plans are already advanced for the building of a larger Recycler with increased capacity.



The "Recycler"

❄ ❄ ❄ Snowtime, folks ❄ ❄ ❄



This year thousands of skiers will be tackling Victoria's alpine slopes.

And, be it downhill or cross country skiing, there is no doubting that the sport is an acquired skill.

However, driving in alpine conditions also demands an acquired ability: one many people do not equip themselves for.

The RCA has come to the rescue with its updated, comprehensive "Snow Driving Guide", which covers the basic rules to follow when driving in snow and ice conditons.

The free, colour booklet is invaluable for the driver as it explains the fundamentals of alpine motoring, how to cope with emergency situations, chain fitting, parking and lots more.

For your copy ring the Road Constructon Authority's Head Office on **(03) 860 2430** or the RCA's North Eastern office at Benalla on **(057) 62 2288**. The brochure will also be available through most RACV offices.

Roads Victoria **Winter 1989**

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Read all about it

The following publications are available free of charge by sending the list and coupon below to the RCA:

Project leaflets

☐ A Bypass for Ballarat
☐ Bell St/Banksia St Link, Heidelberg
☐ Bypass of Greensborough Commercial Centre
☐ Calder Highway, Bypass of Gisborne
☐ Dandenong Road - Princes Highway East duplication
☐ Hume Freeway, Baddaginnie to Bowser
☐ Hume Freeway, Euroa Section
☐ Hume Freeway, Springhurst to Wodonga
☐ Lilydale Town Centre Bypass
☐ Metropolitan Ring Road: Broadmeadows Section
☐ Mornington Peninsula Freeway Extension, Dromana to Frankston (opening brochure)
☐ Princes Highway, Genoa River Crossing
☐ Princes Highway, Moe River to Moe
☐ Princes Highway, Morwell Bypass
☐ Princes Highway, Tynong
☐ Punt Road Information brochure
☐ Ringwood Bypass
☐ Wells Road - Boundary Road duplication
☐ Western Freeway, Bypass of Dimboola
☐ West Gate Freeway - A new shape for South Melbourne

General publications

☐ Bike Easy (RTA leaflet)
☐ Bridges
☐ Driver's Guide to Victoria
☐ Great Ocean Road: a brief history
☐ Guide to reduction of traffic noise
☐ Heavy duty flexible pavements
☐ History of the Hume
☐ Hume 31, a freeway from Melbourne to Wodonga
☐ Paving the way - roads in Victoria 1913 to 1988
☐ Roads Victoria (back issues available)
☐ Snow Driving guide
☐ Sound Barriers
☐ Spotto (game)
☐ Warning Signs

NAASRA pamphlets

☐ Bush track to highway
☐ Cost of Roads
☐ Fifty years of NAASRA
☐ History and challenge of road transport
☐ Landscaping of roads
☐ Road bridges
☐ Road signs and markings
☐ Roads and computers
☐ Roads and energy
☐ Roads and national development
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☐ Roads and public utilities
☐ Roads and vehicle limits
☐ Roads, bicycles and bikeways
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☐ Road construction and maintenance
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Name ....
Address ....
Postcode ....

Send your details to : **Corporate Affairs**, Road Construction Authority, 60 Denmark St., KEW, Victoria, 3101 (or telephone **(03) 860 2880**).

In Victoria, it's going to be roads under the one roof.

A total merger of the functions of the Road Construction Authority and Road Traffic Authority from July 1, 1989, has been determined as the best way to minimise costs and to gain the highest level of efficiency for improved road services for Victorians.

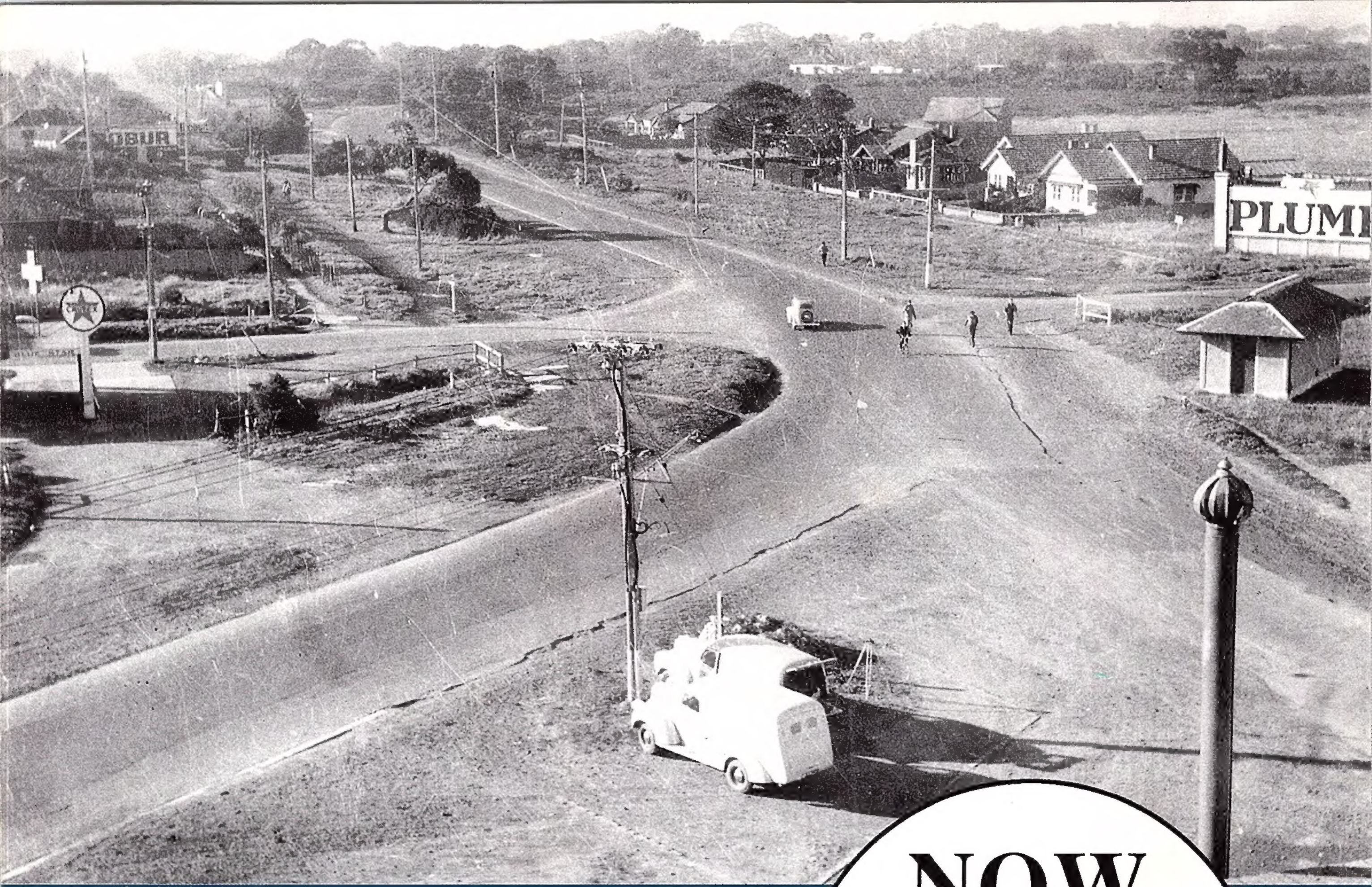
For many years, road services were provided by a number of organisations, and since 1983 they have been concentrated in two authorities, the RCA and RTA, both working in conjunction with local government. This further amalgamation will remove areas of duplication and overlap, and will greatly help overcome problems of community confusion on areas of responsiblity for road and traffic issues.

Under the one roof of the Roads Corporation, the merging of RTA and RCA functions such as human resources, finance, executive services, general services, management information technology, public relations and corporate affairs, traffic and accident data, plus traffic management and traffic engineering would save about $15 million a year which would be deployed for improving roads and services.

The merger is also expected to provide more efficient operation in economic development of roads by its improved integrated planning and a single comprehensive approach to road safety and regulatory programs.

Access by the public will be improved through 'one-stop shops' and increased regional network facilities.

This move is part of an overall rationalisation of transport services: the the Metropolitan Transport Authority (The Met) and V/Line are also being merged.



NOW & THEN

The advertising billboard for Plume has long been discarded from this intersection where Pt. Nepean Road (now Nepean Highway) meets Warrigal Road in Mentone.
Above shows the tranquil rural scene in 1947, in contrast to the same location today.